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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/479,267	01/06/2000	MASAKI UENO	073600.P022	2842

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EXAMINER	
MILLER, BRIAN E	

ART UNIT	PAPER NUMBER
2652	

DATE MAILED: 04/03/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/479,267	UENO ET AL.	
	Examiner	Art Unit	
	Brian E. Miller	2652	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 January 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Claims 1-4 are pending.

Response to Arguments

1. In view of the Appeal Brief filed on 1/16/02, PROSECUTION IS HEREBY REOPENED. A new ground of rejection is set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) request reinstatement of the appeal.

If reinstatement of the appeal is requested, such request must be accompanied by a supplemental appeal brief, but no new amendments, affidavits (37 CFR 1.130, 1.131 or 1.132) or other evidence are permitted. See 37 CFR 1.193(b)(2).

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-4 are rejected under 35 U.S.C. 103(a) as obvious over Aoshima et al (US 6,046,892) in view of Iwasaki et al (6,157,525).

Aoshima et al discloses a spin valve magnetoresistance sensor (20), as shown primarily in FIGs. 4 & 5, including: a base layer (21, 22) layered on top of a substrate (not shown, see col. 3, line 3); the base layer including a first base film 21 having a nonmagnetic metal, i.e., Ta and a second base film (22) formed on top of the first base film; the second base film (22) having an alloy represented by NiFeX wherein X includes one of Cr, Nb and Rh, i.e., NiFeCr, the second base film having a face-centered cubic (fcc) structure and a (111) orientation. The fcc structure is inherent to the NiFeCr layer since it follows from the PdPtMn being of fcc structure, i.e., the head would not operate properly if NiFeCr (and Ta layer 21) did not also have a fcc structure. Aoshima et al is expressly silent, however, as to the NiFeCr layer having an (111) orientation, which orientation is the preferred one when the layers of the MR element have an fcc structure. Iwasaki et al et al discloses that NiFeCr has an fcc structure and (111) orientation (see col. 8, lines 32-36). This fcc magnetic film promotes the fcc (111) orientation. Thus, a large resistance change ratio due to the smooth surface and the soft magnetization due to the fcc (111) orientation can be accomplished.

From this teaching, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have provided the above NiFeCr film to have had a fcc structure and (111) orientation, as taught by Iwasaki et al. The motivation would have been: having an fcc structure with an (111) orientation produces a highly orientated crystal structured film which obtains good soft magnetic. A film having such characteristics would contribute to producing a

high-sensitivity, stable MR element with high magnetoresistance output, as would have been realized by a skilled artisan, and as discussed in Iwasaki et al.

Still further, as per claim 2, Aoshima et al disclose the film thickness of the second base film (22) is within a range of 20 to 100Å, i.e., 3 nm (equivalent to 30 Å, see column 3, line 38); as per claim 3, Aoshima et al disclose that the content of Cr in the second base film (22) is within the range of 20 to 50 at%, i.e., 24.3 at% (see col. 4, line 31); and as per claim 4, the spin valve MR sensor is located within a thin film magnetic head (see FIG. 4).

5. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aoshima et al (US 6,046,892). Aoshima et al discloses a spin valve magnetoresistance sensor (20), as shown primarily in FIGs. 4 & 5, including: a base layer (21, 22) layered on top of a substrate (not shown, see col. 3, line 3); the base layer including a first base film 21 having a nonmagnetic metal, i.e., Ta and a second base film (22) formed on top of the first base film; the second base film (22) having an alloy represented by NiFeX wherein X includes one of Cr, Nb and Rh, i.e., NiFeCr, the second base film having a face-centered cubic (fcc) structure and a (111) orientation. The fcc structure is inherent to the NiFeCr layer since it follows from the PdPtMn being of fcc structure, i.e., the head would not operate properly if NiFeCr (and Ta layer 21) did not also have a fcc structure.

Aoshima et al is expressly silent, however, as to the NiFeCr layer having an (111) orientation, which orientation is the preferred one when the layers of the MR element have an fcc structure. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have provided the above NiFeCr film to have had a fcc structure and (111) orientation.

The fcc structure in an (111) orientation is known to have a highly orientated crystal structure while no magnetic anisotropy appears in this orientation. Furthermore, such orientation is the closest packed orientation, i.e., most stable. These favorable characteristics would have been realized by a skilled artisan.

The motivation would have been: having an fcc structure with an (111) orientation produces a highly orientated crystal structured film which obtains good soft magnetic characteristics. A film having such characteristics would contribute to producing a high-sensitivity, stable MR element with high magnetoresistance output, as would have been realized by a skilled artisan.

Still further, as per claim 2, Aoshima et al disclose the film thickness of the second base film (22) is within a range of 20 to 100Å, i.e., 3 nm (equivalent to 30 Å, see column 3, line 38); as per claim 3, Aoshima et al disclose that the content of Cr in the second base film (22) is within the range of 20 to 50 at%, i.e., 24.3 at% (see col. 4, line 31); and as per claim 4, the spin valve MR sensor is located within a thin film magnetic head (see FIG. 4).

Response to Arguments

A...Appellent contends on page 5 that "Aoshima does not show, disclose, or suggest an fcc structure and 111 orientation." (emphasis added by applicant)

The Examiner no longer relies on inherency, however, from at least the teachings of Iwasaki et al and/or the knowledge of a skilled artisan, it would have been obvious to have provided the NiFeCr film of Aoshima et al with a (111) orientation, if not having one already. The technical reasoning to reasonably support this determination is the knowledge that to achieve a higher pinning field in a spin valve MR sensor, it is needed to have a highly orientated crystal structure,

which preferred structure is known commonly as an fcc structure with a (111) orientation. The Examiner considers that the fcc structure (111) orientation necessarily flows from the NiFeCr layer of Aoshima as is suggested by the teachings in Iwasaki et al.

B...The Examiner considers applicants' remarks on page 6 moot, because these contentions are not pertinent to the main issues and/or not maintained by the Examiner.

C...The Examiner would like to point out that in the Advisory Action (mailed 7/16/01) comments were made by the Examiner in which the applicant has not responded to. The Examiner stated:

"Applicant has failed to explain how the IDENTICAL compound disclosed by Aoshima would have different properties in either fcc structure or orientation vs. the SAME COMPOUND of the claimed invention. Until further evidence is presented by Applicant (such as affidavit evidence through comparative testing between Applicant's invention and Aoshima), the Examiner maintains that the NiFeCr film of Aoshima is inherently an fcc with (111) (sic) orientation. Specifically, both Applicant's invention and Aoshima's invention use an NiFeCr film with the same atomic percentage of Cr (24-25%) in substantially the same thickness (3-5nm) in exactly the same Ta base film (also substantially the same thickness (3-5 nm)) for the same purpose of improving the MR response in a spin-valve MR head. Anticipation in view of Aoshima is maintained."

Applicant does not set forth any evidence that would patentably distinguish the claims from Aoshima.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure including US Patents to Saito et al (5,796,560), Nishioka et al (5,648,885), Huai et al (6,175,476) and JP Patent application to Saito et al (8-315326), all of which are cited to show the importance of an fcc structure and (111) orientation.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian E. Miller whose telephone number is (703) 308-2850. The examiner can normally be reached on M-F 8am-5:30pm (FF off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T. Nguyen can be reached on (703) 305-9687. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9314 for regular communications and (703) 872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4750.

Brian E. Miller
Primary Examiner
Art Unit 2652

bem
March 27, 2002